

BEAUTY AND POWER  
FEATURES OF THE

**THOMAS**



**AUTOMOBILES**

**E.R. THOMAS MOTOR CO**

**BUFFALO, N.Y. U.S.A.**

*Members of Licensed Association of Automobile Manufacturers*



# THE IDEAL CAR

**The Problem of Every Progressive Automobile Manufacturer is to Find the Maximum of Speed and Strength with the Minimum of Weight**

The new Thomas "Flyer," so named by Mr. C. A. Coey, our enthusiastic Chicago agent, is the nearest approach to this ideal.

The closest competitor in its class draws 30 per cent. more weight per horsepower. Note:

	Car	H. P.	Weight	Weight per H. P.	Capacity
Competitor	\$1500	20	2500	125 lbs.	3 people
Thomas	\$1500	24	2000	83 lbs.	5 people

The Thomas is constructed on the lines, both in mechanism and design, of the very latest 1904 Panhard and English models, and is in accordance with the principles advocated by the world's leading gas engineers.

The Thomas is miles faster, with greatly reduced expense for tires and operation, on account of reduced weight.

The Thomas represents the most progressive type of automobile building and is the nearest American approach to standard.

In order to meet the popular demand, to produce a touring car of great speed and hill-climbing power, coupled with lightness and strength, it became necessary to adopt a multiple-cylinder motor, and to choose either a two, three or four-cylinder model. After a very thorough investigation and inquiry among domestic and foreign makers of motors for automobiles, marine and electric lighting purposes, besides spending many thousands of dollars in experiment in our own works, we decided in favor of the triple-cylinder motor as meeting automobile requirements in the highest degree.

That we are not alone in our conclusions is shown by the fact that the great Westinghouse Works build this type exclusively where a steady, high speed without vibration is necessary. The Leeds Equipment Co., of Bridgeport, Conn., use and recommend it for launches when great speed, simplicity, high efficiency and greatest power are required. They have no four-cylinder motors, because, as they say, "it would mean just one third more working parts to look after."

Turning to the foreign automobile makers, we find some of the best known among them adopting triple-cylinder motors after exhaustive tests. Among them are such concerns as Panhard of France, and the English firms manufacturing the Maudslay, Brooks and Argyle cars, all of whose latest models are thus equipped.

A three-cylinder car recently made a record non-stop run in England of over 600 miles. In the late endurance contest, the English Daimler, a three-cylinder machine, won every prize in its class against the best foreign makes of other types.

The editor of a leading English journal says, in a recent letter: "The three-cylinder motor is distinctively superior to and has less competition than the four-cylinder motor."

Westinghouse Manufacturing Co. say: "Inasmuch as three-cylinder engines are eminently satisfactory for electric lighting, as built by us, it would be folly to complicate all their parts of operation."

Quoting from a letter received from the Wolverine Motor Works of Grand Rapids, Mich.: "One of the principal reasons why we adopted triple cylinders is because we can balance the engine better, and get a more uniform exhaust than by any other number of cylinders."

Simplicity is always desired; therefore (quoting from a prominent manufacturer), "the least number of cylinders that will give the necessary weight, steady torque, and compact arrangement should be adopted, and since the triple cylinder does this, it is unquestionably preferable."

Summing up, it will be seen that the triple-cylinder motor is no experiment, being successfully used and advocated by the world's leading manufacturers. The failure of the local manufacturers in earlier stages was absolutely due to faulty design.

There are no dead centers, because the three crank throws are set at an angle of 120 degrees with one another, hence the rotating parts are always in balance.

There are no extra weights to counterbalance vibration, hence every ounce of the explosion counts for power.

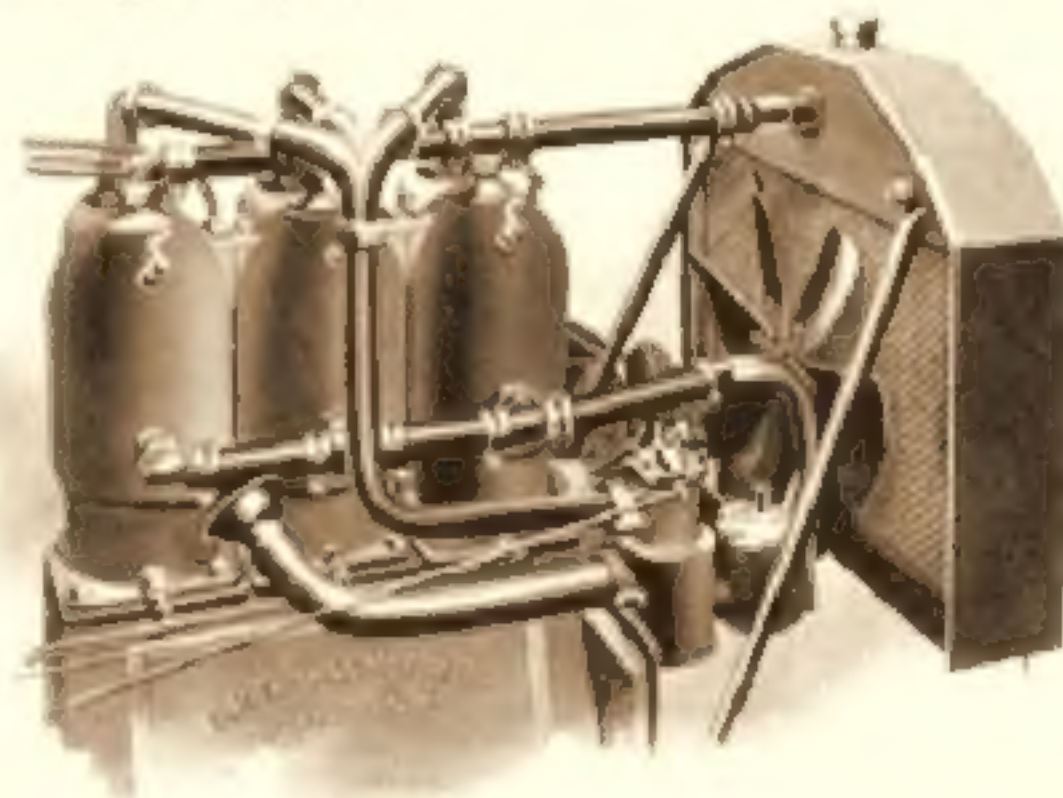
There is a practical absence of vibration at all speeds; whereas, this is true of the double-cylinder vertical motor only at the one speed for which it is balanced.

It furnishes long life and durability to both motor and car, and comfort to the passengers.

It has an impulse at every two-thirds revolution, meaning high speed steadily maintained on the level and up grades.

It is the lightest motor consistent with the required power, consequently it means a light car and highest efficiency. Economical in operation and up-keep.

In a word, the triple-cylinder motor gives us high speed, high efficiency, the greatest amount of power for a given size of cylinder, or for a minimum of weight, a maximum of speed and power.



Motor, Water and Electric Connections, Fan, Radiator, Carburettor, Air and Gas Tubes

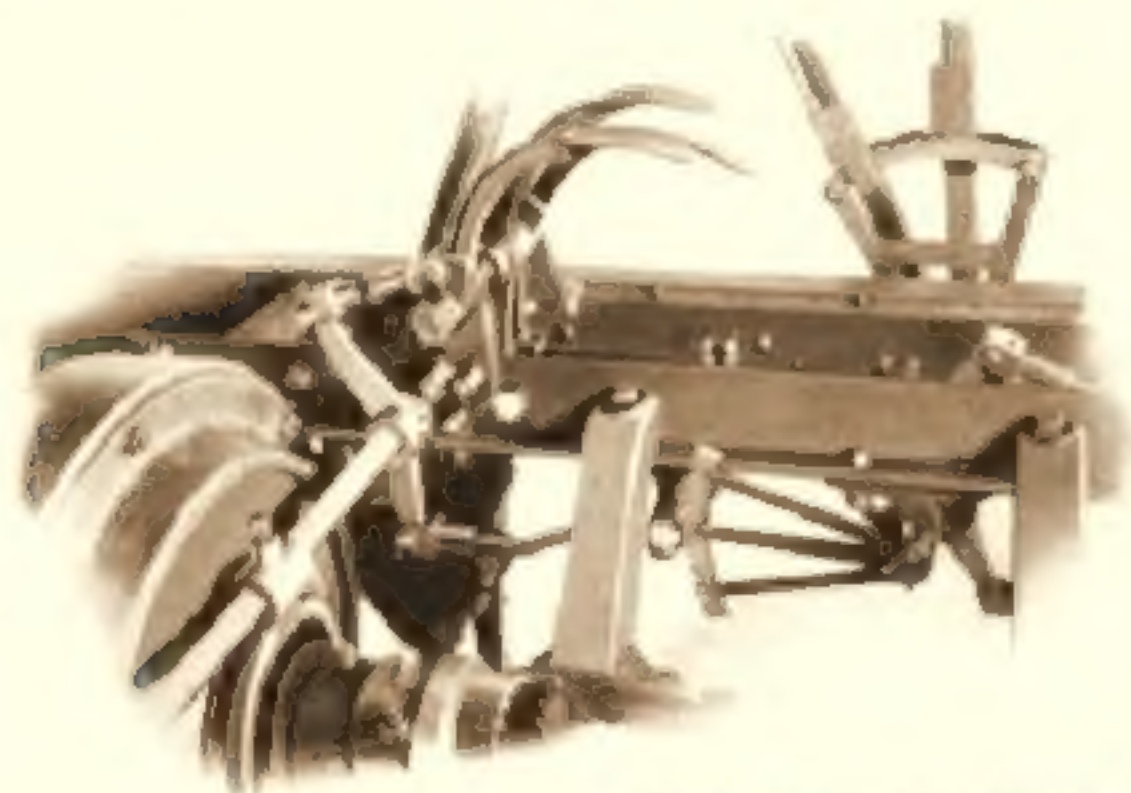


# SOME SPECIAL FEATURE OF THE THOMAS 24 H.-P. TRIPLE-CYLINDER CAR

**Motor.** Triple cylinder, vertical, 24 H. P., mounted under front hood. A motor developing a maximum of power for a minimum weight and size. All vibration eliminated.

**The Motor Base** is cast from aluminum alloy and affords four solid bearings for crank shaft. The outer bearings are provided with chain lubrication and will run 1000 miles with one oiling. The inner bearings as well as the pistons and the connecting-rod boxes receive splash lubrications. Crank-axle bearings are very large, and are accurately ground and lapped. All connecting-rod boxes are of bronze and babbitt. Intake valves are very accessible—any one of them can be removed and reglazed in one minute; in fact, any part of the motor can be gotten at easily and quickly.

**The Crank Shaft** is self-oiling, milled from a solid steel forging. The shaft bearings, *large and strong* (166 square inches of bearing surface in the four bearings), are turned to size and polished with great care. No counterbalancing weights required.



Locking Device, Fly Wheel, Clutch and  
Disengaging Lever

The Cylinders are cast separately, each cylinder and head being in one piece. After the cylinders are bored out to size they are ground and lapped to a beautiful polish. Cylinders are securely bolted to base, have ground joints, no gaskets.

**The Rings** are made after the most improved design and are ground by our secret process on the three bearing surfaces. Our rings are perfect and will micrometer exactly alike. Five of these rings are used—four at upper part of piston for compression and one at lower part, the latter to act as a balance, and an oil retainer and distributor.

**The Piston** is machined, lapped and polished with the same care given the cylinder and rings. Wrist pin is of tempered tool steel.

It is this extreme care in the manufacturing which has given to the Thomas Motor the just reputation of developing more power in proportion to size than any other.

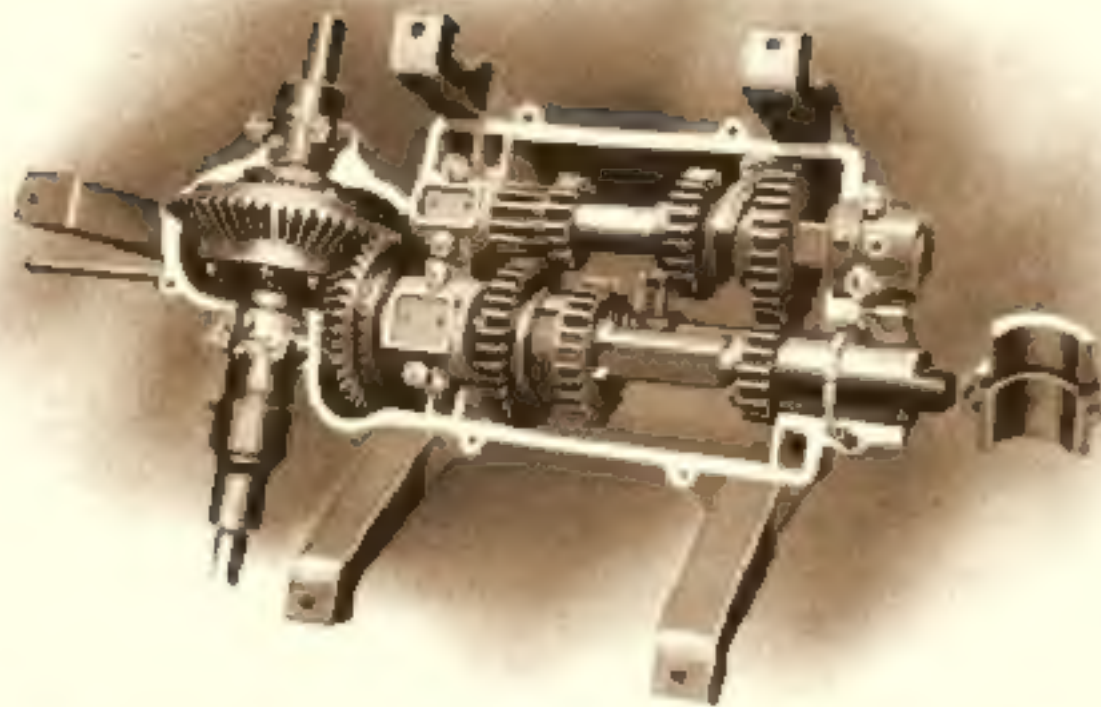
**Lubricating of Cylinders** is by a force-feed device attached to dash. This arrangement is provided with hot-water tube to warm oil in cold weather and a warm-air tube to supply pressure. Both tubes are adjustable. The supply of oil is carried through sight-feed regulators. *Lubrication is therefore positive and absolutely under control.*

**Locking Device** (see cut) in connection with transmission makes it impossible for clutch to engage motor until gears are perfectly in mesh. Once the clutch is thrown out by foot, and speed lever is moved slightly, there is no danger to the gears, even though foot is lifted.

**Transmission.** Sliding gear (patent applied for), three forward speeds and reverse, running direct on high speed without a gear engaged. Entire gearing, including differential, enclosed and running in oil bath. All outer bearings fitted with chain oilers. Ball bearings of large size relieve end thrust in both directions. All main bearings of hardened tool steel, accurately ground, very large and strong.

The transmission (patent applied for) is wonderfully strong and simple. All journals are extra large, made from hardened steel, ground true. By means of the safety device no change of speed can be effected without the clutch is first disengaged, thereby eliminating the danger of stripping gears. When running on high speed it gears direct, the secondary shaft remaining idle. This feature reduces noise to a minimum and also economizes power.





**Transmission, Shifting Gears, Chain Oiler, Ball Thrust and Differential**

The transmission clutch is self-contained within the fly wheel and operates without exerting any end thrust whatever. This feature alone adds years to the life of the car. The clutch spring is adjustable.

The transmission oiling arrangements are such that the machine can be run more than 1000 miles with one oiling. The end bearings have chain lubrication, while all other bearings and gears run in an oil bath.

The transmission case is made of aluminum and when bolted down is oil tight. An easily removable hand-hole plate allows inspection of gears and shifting mechanism.

**The Ratios of Speed** when car is equipped with 25 and 40-tooth sprockets, ordinary touring equipment, are: To each revolution of rear or driving wheel is required of motor shaft, on high speed or direct drive, 2.4 revolutions; on second speed, 3.9; on slow speed, 7.8; and on the reverse, 10.2. In other words, with motor running 900 revolutions per minute a speed of 35 miles per hour would be attained on high gear and 10 miles on low.

**Muffler.** Very silent and efficient.

**Wheel Base.** 84 inches.

**Gauge.** 56½ inches.

**Chain.** Double drive, roller, detachable link.

**The Bearings** on four wheels and countershaft are rollers made from tem-

pered tool steel, accurately ground. They are very large and constructed to exclude perfectly all dust and moisture. One packing of lubricating grease lasts for thousands of miles.

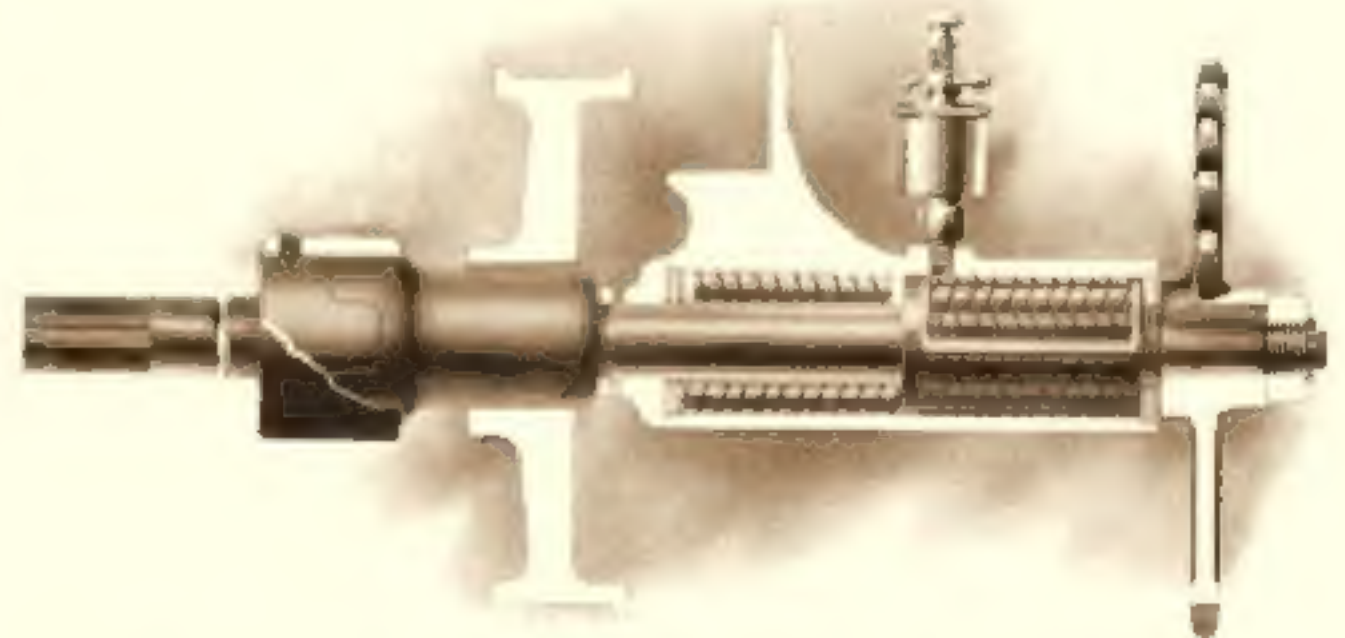
**Wheels.** Wood, artillery pattern, patented, 32 x 4 inches. Dust-proof roller bearings.

**Sprockets.** Interchangeable, allowing speeds up to 50 miles per hour—see "speed ratios" above.

**Brake.** One foot brake on differential shaft, operated by foot lever, two on drums attached to rear wheels. All brakes can be applied at once by throwing on emergency lever. The brakes are powerful, but are never operated with clutch engaging fly wheel. The application of one or all of these brakes disengages clutches automatically. They are double acting (patents pending), and very strong on reverse as well as forward.

**Steering Device.** Worm-and-gear type, Hoadley patent, adjustable both in steering post and sector; all enclosed, making it absolutely dust-proof. The worm engages five teeth at all times, whereas the ordinary engages but one or two (see cut).

**Transmission of Power** to rear wheels is by two chains, each pulling between the outside and inside roller bearings of each driving wheel—a valuable feature.



**Sectional View of Countershaft, Coupling, Brake Drum, Roller Bearings and Sprocket**



**Electrical Switch, Spark Gaps, Three Vibrator Coils, Oiler** (force feed and visible sight feed), all housed under a new design metal dash board, which curves back at top and sides.

**Cooling System.** Honeycomb radiator of large capacity, exhaust fan attached. Pump of large capacity is geared to motor. Pump is fitted with strainer and oil trap. Cylinders and valve chambers have large water jackets. (See cut of motor, radiator and fan.)

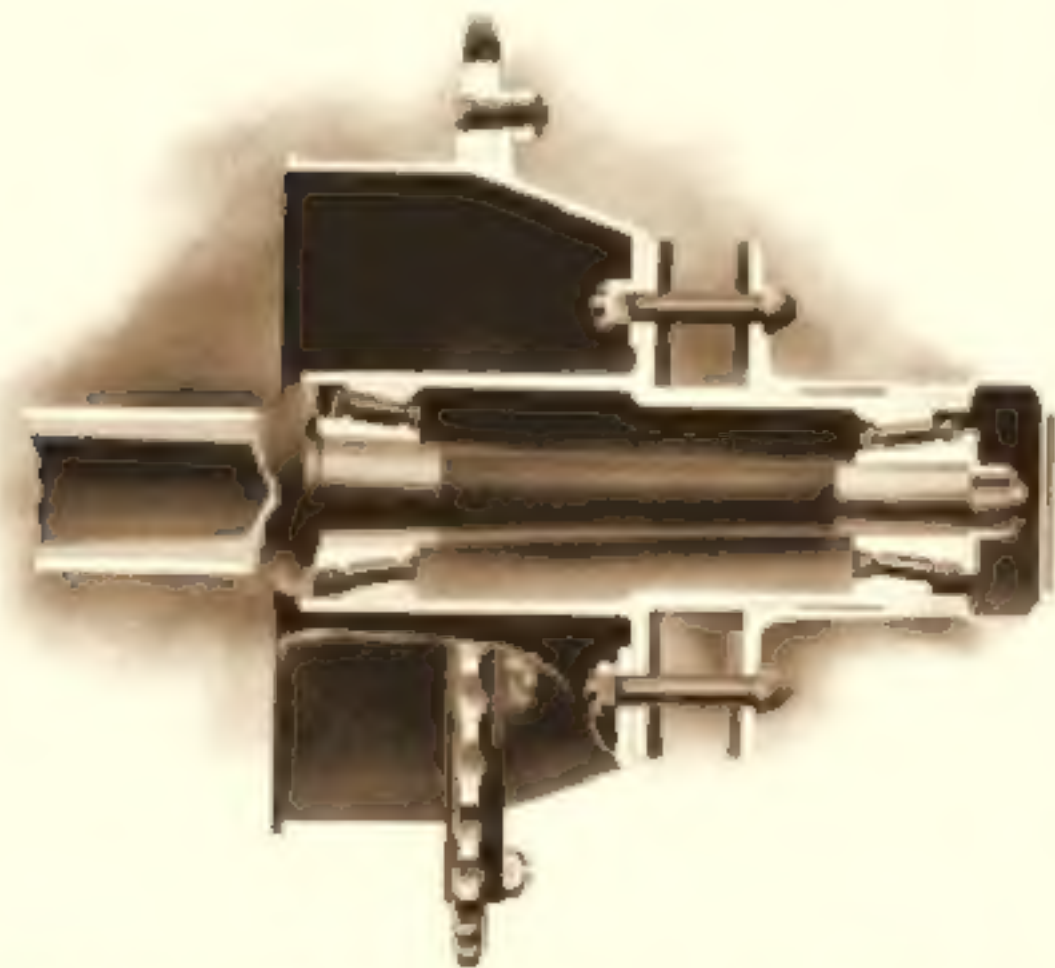
**Carburettor.** Thomas improved, float feed type, of ample capacity, is set for normal speed, but is also provided with foot lever control.

**Universal Joints** between fly wheel and gear case, and on either side of countershaft, thus ensuring perfect alignment in operation. Fly wheel, motor shaft, cylinders, pistons, gears, shafts and countershafts can be removed without disturbing the alignment of the bearing boxes—a very important feature for quick and perfect repairs.

**Main Frame.** Steel plate, angle steel riveted top and bottom; to this is riveted the angle steel sub-frame to which is bolted motor and transmission.

**Axles.** Heavy solid drop-forged-steel axles, yoke and knuckles; axle tubes of best seamless steel, 9 gauge.

**Tires.** Detachable, 4 inches x 32 inches.



Sectional View of Rear Hub, Sprocket between Roller Bearings and  
Emergency Brake Drum

**Springs.** Extra heavy and large, and reinforced on either end, made from best steel, oil tempered. 40-inch front and 44-inch rear.

**Gasoline Capacity.** 15 gal.

**Water Capacity.** 3 gal.

**Body.** A great deal of care has been used in designing the body, resulting in something very striking and artistic. This, with the splendid finish and luxuriant upholstery of finest hand-buffed leather and brass trimmings, makes it a car without an equal in appearance.

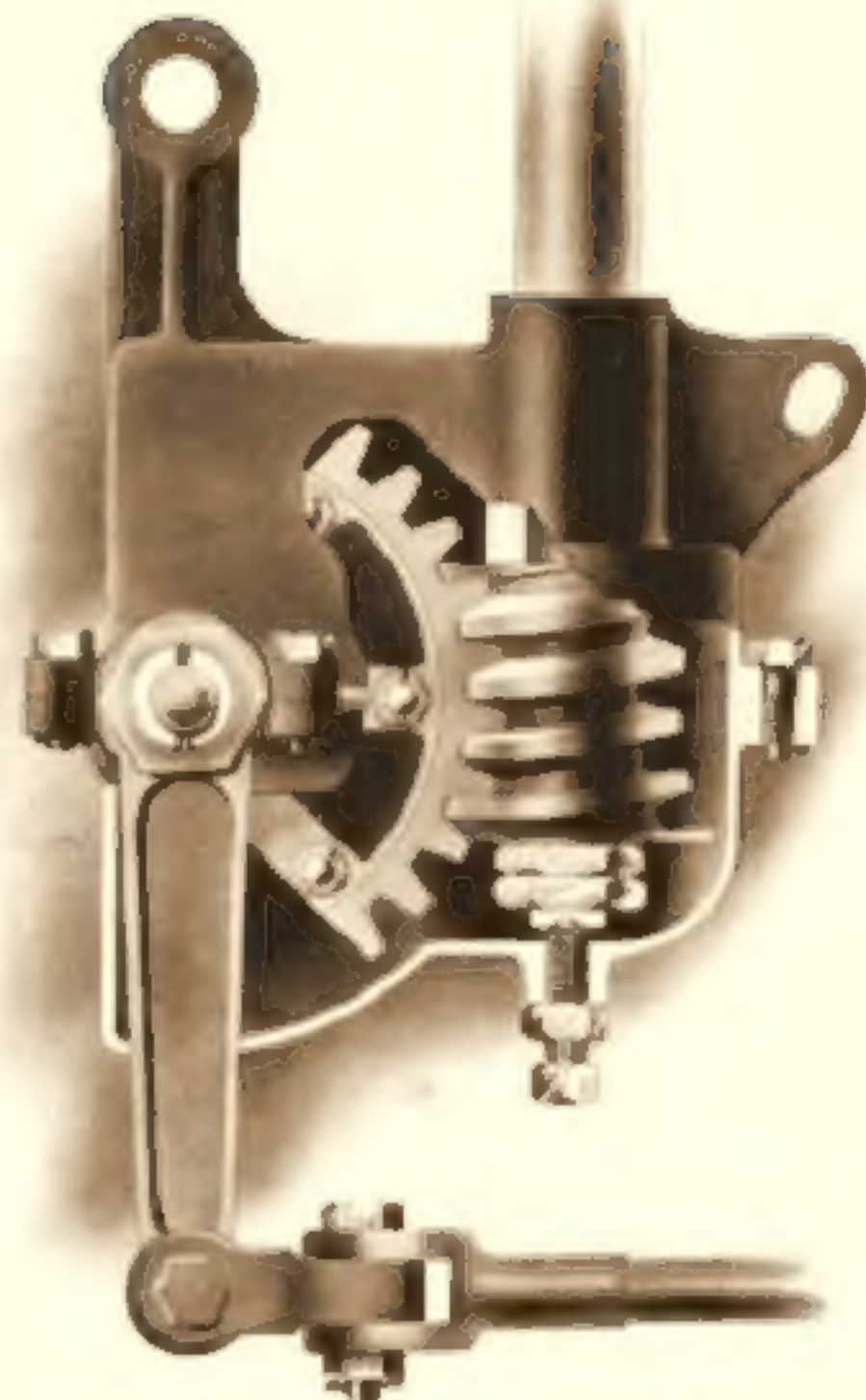
Improved King-of-Belgium type tonneau with curved lower body. Very roomy, high back seats, wide door. Heavy top roll, deep tufting, brass trimming. Third seat hinged to door, effectively locking door when let down. Tonneau will seat three full-grown persons comfortably.

**Finish.** Highest coach quality. All bright parts polished brass.

**Color.** Automobile red or green.

**Canopy Tops** with glass front, also Limousines and Pullmans at reasonable prices.

**Tools.** All necessary tools.



Steering Gear, Concave Worm Engaging Four Teeth,  
Dust-Proof Gear Adjustment

**Price, \$2500.00**



# DO YOU KNOW?

**Do You Know** that we have increased the power of the Auto-Bi?

**Do You Know** that the Auto-Bi's new powerful motor gives it more power for weight than any other motor cycle?

**Do You Know** that we have increased size of all bearings on motor?

**Do You Know** that the fly wheel and crank shafts are single drop forgings and are machined in same fixture, making shaft true with fly wheel?

**Do You Know** that there is a hardened ground steel sleeve that is securely fastened over crank shafts, making a perfect shaft?

**Do You Know** that the Auto-Bi is the best hill climber in America?

**Do You Know** that the Auto-Bi is the only cushion-frame, spring truss fork motor cycle?

**Do You Know** that an arch of truss is the strongest known mechanical construction?

**Do You Know** that a solid truss fork simply transfers the breaking strain from fork to bottom tube to frame, thus intensifying danger of breakage there. With our spring truss fork all sudden shocks are taken up in cushion, thus taking strain off both the frame and fork?

**Do You Know** that our fork also eliminates handle-bar vibration, thereby removing strain on wrist and arms caused by rigid forks of any construction?

**Do You Know** that there have been many deaths owing to weak fork construction?

**Do You Know** that our forks have been in the hands of the public for a year with a record of not a single broken one?

**Do You Know** the hygienic cushion frame absorbs road concussion and motor vibration, eliminates crystallization and increases the life of the frame?

**Do You Know** that the frame has been greatly reinforced, to take added power, and that particular attention has been paid to the construction of the 1924 cushion frame and connections?

**Do You Know** that bicycle makers cement the grips to the handle bars so that a rider would have a firm hold and perfect control of his wheel on all roads?

**Do You Know** the dangers of a loose grip, particularly on rough roads?

**Do You Know** that your wrist is under a severe strain to hold a movable grip at a certain place, to maintain a desired speed?

**Do You Know** that the Auto-Bi has not the above dangerous features, but has a solid main grip, and an auxiliary grip on handle bar?

**Do You Know** that this auxiliary can be operated by first finger and thumb, leaving balance of hand to steady machine on rough roads, going in and out of traffic, and around corners?

**Do You Know** that the grip raises and lowers exhaust valve lift, advances and retards spark, but does not cut out switch?

**Do You Know** that your motor with exhaust relief closed and switch off is a very good brake?

**Do You Know** that when you cut out switch and raise exhaust relief with same lever on grip that you lose this powerful friend, which is very useful in going down steep hills?

**Do You Know** that with the old reliable left-grip cut-out switch you still have the motor for a brake, and that very much less movement to stop is needed than with a three-operation grip, because the left grip does not have to turn so far before current is broken and motor stopped?

**Do You Know** that the steel and leather belt eliminates the strain on motor, eliminates the strain on tires, increases hill climbing capacity, increases speed, increases mileage many times, saves the annoyance of belt stretching and breaking?

**Do You Know** that we have changed our front pulley from V to U to relieve all wear on belt?

**Do You Know** that a kick of left foot will open cut-out and muffler, and that another kick will close it?

**Do You Know** that by taking out one screw you can remove the core of muffler for cleaning?

**Do You Know** that the gasoline, oil and battery box are in one tank, of very neat design?

**Do You Know** that our battery box will take either six No. 5 cells or three No. 6 cells? You can buy one or the other any place.

**Do You Know** that there are no tools necessary to open the battery box, which has an automatic clip fastening?

**Do You Know** that our gasoline tanks have a capacity of five quarts? Most others have only four quarts or less.

**Do You Know** that the Auto-Bi has the world's record for consumption test?

**Do You Know** that the oil tank's capacity is 1½ pints?

**Do You Know** that the oil feed will feed any kind of oil in any kind of temperature?

**Do You Know** that the rider has a sight gauge glass in plain view at all times, and by lifting a lever the oil will feed if there is any in the tank? You know this because you can see it without turning head or body.

**Do You Know** that you are doing yourself an injustice if you don't try to get the agency for this Auto-Bi?

**Do You Know** that our address is 1200 Niagara Street, Buffalo, N. Y., U. S. A.



Every Thomas Car is Tested like this in Actual Use on the Road



## E. R. THOMAS MOTOR CO.

MANUFACTURERS,

BUFFALO, N. Y., U. S. A.

### REPRESENTATIVES

C. S. HENSHAW	-	NEW ENGLAND	-	288 Columbus Ave., BOSTON
WOOLSTON & BREW	-	NEW YORK & BROOKLYN	-	152 W. 56th St., NEW YORK
C. A. COEY & CO.	-	ILLINOIS	-	5311 Cottage Grove Ave., CHICAGO
BALTIMORE MOTOR CAR CO.	-	MARYLAND	-	BALTIMORE, MD.
CANADA CYCLE AND MOTOR CO.	-	CANADA	-	TORONTO, ONT.

## THOMAS AUTOMOBILE BOATS

In designing the Thomas "Flyer" Automobile Boat, we aimed to build a roomy speed launch that is not a freak, but that would be suitable for family or club cruising, and although attaining speed was one of our principal aims, we have not sacrificed any lines necessary to make the boat durable, comfortable and seaworthy.

The following are the specifications:

30-foot length of water line,

5-foot beam, molded,

25 1/2-inch freeboard,

7 1/2-inch draft,

Weight of boat about 1200 lbs.

24 H. P. motor, 3 cylinders,

Weight of motor, 280 lbs.

Displacement about 1400 lbs.,

14 to 18 seating capacity

### SPECIAL FEATURES

Needle-point bow.

Very wide stern.

Widest section of water line is at stern, although whole boat is wider on water line than on deck line.

Hull very strongly built; frames run from deck to deck. It also has two bilge clamps running full length of boat.

It has 3-inch tumbled home stems, which add to the appearance of the water line.

All plankings are wrought fastened.

It is fitted with a reversible 3-lucket, 26-inch wheel, and has rudder which swings on a pivot.

It is equipped with front and side steering wheel.

The steering cables have turnbuckles with which to take up slack.

There are six large, roomy lockers forward and two aft.



# Specifications Thomas Auto-Bi Model 36.

HEIGHT OF FRAME, 22½ inches.

WHEELS—28 inches.

TIRES—Goodrich, Motor Cycle.

NEW DEPARTURE BRAKE—Especially large hub and braking surface.

WEIGHT—110 pounds.

WHEEL BASE—47 inches.

HUBS—Specially constructed front hub.

FRONT AND REAR MUD GUARDS.

HEAVY SPOKES.

TUBING—Shelby weldless, 1½x16 and 18 gauge, reinforced.

HEAD TUBE—5½ inches, one piece, drop forged.

CONNECTING JOINTS—Drop forged, outside joints.

SEAT POST—Forward Extension L.

SADDLE—Messenger double coil spring.

FORKS—Coiled spring truss fork, patented.

FRAME—Hygienic cushion spring frame, all parts of which have been strengthened to take added power.

BELT—Thomas leather and steel, unstretchable, unbreakable. Patent applied for.

MIXER—Thomas improved, good for any kind of weather.

TREAD—6 inches.

MOTOR—3 H. P., forged fly wheels and shaft same piece, large bearings hardened and ground, cylinders lapped, 4 piston rings ground true, oil tight.

CONTROL—Auxiliary grip on handle bar for spark adjuster and exhaust lift.

OLLER—New sight feed in view of rider at all times without turning body.

HANDLE BARS—20 inches wide. Left switch.

INDUCTION COIL.—Made to order, wires emerging at one end.

ENGINE PULLEY—Corrugated, with oil receiver.

REAR PULLEY—"V" shaped, steel.

ROLLER—Automatic, ball bearing, adjusting.

SPARK PLUG—The Thomas, porcelain or mica.

GASOLINE TANK—5 quarts, very large.



OIL TANK—1½ pints.

BATTERY BOX—Automatic Clip Lock, for either No. 3 or No. 6 cell.

MUFFLER—Removable core, with cutout exhaust for racing.



# SPECIAL FEATURES

If a Car does not include the following Very Important Features it is Out of Date, and Not Equal to the Thomas, for Every Feature Mentioned is Highly Essential to Efficiency, Durability and Economy of Repairs and Tires.  

**WEIGHT.** "The problem of every progressive automobile manufacturer is to find the maximum of speed and strength with the minimum of weight." The lightest weight per horse power, consistent with strength, insures the best hill climber, highest speed, and greatest economy of tires. Built especially strong for American roads, yet please note that the nearest competitor in the Thomas class draws 50 per cent. more weight per horse power.

	List	H.P.	Weight	W.P.M.T.	Capacity
Thomas.....	\$2,500.00	24	2,000	83	5 people.
Nearest Competitor.....				125	5 "

**MOTOR.** Vertical cylinders, cast separately, ground and lapped. Bearings ground and lapped, very wide and long. Four narrow piston rings ground on three wearing faces. Ordinarily American motors have only three wide piston rings or  $\frac{1}{2}$  less protection from compression leakage. An additional piston ring at lower end of piston to prevent over lubrication. Drop forged crank shafts. Hollow pins for self oiling. Hardened rollers on cam shafts to eliminate wear and friction.

**NOISELESS TRANSMISSION (Patented).** Drives direct on the high speed. No gears are in mesh on high speed and it is entirely noiseless. The usual direct drive on high speed, have idle gears in mesh, which adds to the noise and requires additional power. Interlocking device renders it absolutely impossible to strip the gears as they cannot be moved without releasing the clutch. Gears, hardened steel, cut from solid bar, 1 inch face, 6 pitch. Two large, square faced sliding shafts. Exceedingly simple, noiseless and positive throw. Each gear shaft removable without disturbing fly wheel, shaft, or counter shaft. All bearings and gears run in oil. Self-contained clutch, no pressure on motor or other bearings. Clutch spring adjustable. Spring buffers on clutch. Universal joint between transmission and fly wheel.

**COUNTER SHAFT.** Universal joints between sprockets. Counter Shaft may be easily removed without disturbing the alignment of transmission gears or sprocket bearings. The Universal joint prevents the strain of side frame from being carried to the transmission gears or motor mechanism, thus eliminating friction and preserving alignment. Gears: Driving gear, steel, 36 teeth. Bronze gear 54 teeth, 6 pitch, 1 $\frac{1}{2}$  inch face.

**SPROCKETS, SIDE CHAIN DRIVE.** Front sprockets are quickly detachable and vary from 19, 22, 25 or 30 teeth. Adjustable gear for racing, or mountainous, sandy, rough and muddy roads. Rear sprockets 40 teeth.

**CHAIN PULL.** The driving chain pulls between the rear roller bearings, pulling both bearings forward, thus distributing the strain equal between the two. The usual custom is to have the chain pull inside of the inside bearing, the inner bearing being thus pulled forward, taking practically all the strain on a twist, the outside bearing being pulled rearwards, which causes much more friction and reduces life of the inner bearing, as will be plainly seen.

**ROLLER AND BALL BEARINGS.** Timken roller, dust proof, bearings are used on both front and rear axles. Hyatt roller double bearings, very long, dust proof, are used on the counter shaft. Roller bearing is used on clutch thrust collar. Ball bearings are used on thrust end of motor shaft. Ball bearings are used on two thrust ends of trans-

**REPAIRS.** Every part of the new Thomas is so accessible, so independent of the remainder, and so easily replaced after being repaired that it requires very little expert attention. The repairs on the Thomas should be from 25 to 50 per cent. less than that of old style machines of anywhere near the same power.

**CARBURETOR.** The Thomas carburetor is of the constant feed type with automatic air regulator, which is the very latest and most approved design.

**COMMUTATOR.** The commutator is of very simple design, rollers being substituted for tremblers, being practically free from wear and requires no adjustment.

**PUMP.** Pump has a capacity of 5 $\frac{1}{2}$  gallons of water for each 275 revolutions per minute; will throw water 39 feet.

**THROTTLE GOVERNOR (Very Meritorious).** We have a new and original design which is very simple, for which patents are pending. The device can be set and latched at any speed and may be easily changed by the foot. When the clutch is released the carburetor is immediately throttled, very much simplifying control.

**"THOMASINE"—A Car for service all the year round.** The obstacles to extreme pleasure in automobiling are dust, inclement and cold weather, destroying its usefulness and comfort at least half of the time. It has also been impossible for ladies dressed in reception and theatre gowns to attend such functions or make calls in automobiles, restricting their use to summer time.

The Thomas Motor Company has designed a new body which puts an automobile in an all-the-year-round, night and day class, thus adding to its usefulness over 50 per cent., named the "Thomasine."

The "Thomasine," with a capacity for six people, is a new and beautiful design of automobile body that can be converted almost instantly from an enclosed cab to an open summer car without alighting. The car, open for fair weather, resembles the ordinary canopy top designs, but by an ingenious arrangement the beveled plate glass sides and front are suspended overhead, and may be easily let down, completely enclosing the four sides of the tonneau. The rear sashes may be easily detached or left in place as a dust barrier. The driver is also protected by the top, a glass in front and side curtains. The car is luxuriantly upholstered in hand buffed leather, having pockets for card cases, toilet articles, etc. The general appearance of the body is one of well rounded lines, and is even more graceful than the ordinary tonneau design.

Long tours may now be made without the usual equipment of rain coats, blankets, etc., sufficient for a tour round the world, and the addition of the rear glass dust protector will not render it necessary for ladies to exclude their features and hair from view with ugly veils. THE THOMAS INNOVATION HAS REMOVED THE LAST OBJECTION TO AUTOMOBILES, AND ADDS MUCH TO THEIR POPULARITY AND USEFULNESS.

The new design adds much to health and comfort. Arrangements have been consummated to equip the majority of the Thomas cars with "Thomasines," at a very reasonable advance over the list.

**OTHER FEATURES.** The new Thomas Model 22 includes practically every other device found on the very best cars, which insure quiet



# Extracts from Various Journals Reporting the Paris Auto Show which Prove that the Three Cylinder Motor was One of the Features.

Extract from AUTOMOBILE REVIEW, issue of January 9th, 1904:

"A thing to be shown which is receiving attention is the three cylinder motor to take the place of the four cylinder affair."

The following extract from the AUTOCAR, the leading automobile journal of England, issue of Saturday, December 12th, 1903, with reference to the cars exhibited at the Paris Show:

"Cars with three cylinder motors are shown among other types of vehicles by ~~Cottareau~~ et Cie, and so many makers are exhibiting this type of engine that THE THREE CYLINDER MOTOR IS ONE OF THE FEATURES OF PARIS SHOW."

"The foregoing fully establishes the fact that three cylinder cars are regarded as the very latest improvement."

"On the three cylinder cars the Panhard do not use the mechanically operated valve, as the automatic gives entire satisfaction."

"The Panhard three cylinder when exhibited at the last Salon was a tentative venture, but its success has been so great the firm has decided to make it one of their features for 1904. Judging from the way in which some other makers are adopting the three cylinders it would seem as if the two cylinder engine is likely to some date or another to go out of date. The three cylinders, in fact, give almost the same balance and smoothness when running as the four cylinders. The cylinders are separate, as it is now the case with all Panhard motors for the reasons already given, facilitates repairs, etc."

"It will be remembered that the Panhard-Levassor have been experimenting with pressed steel frames in their racing cars during the past year, but the results, they state, have not justified them in adopting the system on ordinary cars."

Extract from January 6th issue of HORSELESS AGE:

"Three cylinder motors were seen on cars of double their last year's percentage. The writer's own belief is that this motor is to be one of the leading types of the future and that the example set this year by the Panhard and Cottareau will find many followers at next year's show."

In concluding the article on the characteristics of the Paris Show, it stated that among the features in motor construction which apparently gain in popularity during the year, the one and most important is THE THREE CYLINDER MOTOR. The features which seem to have lost in popularity and which are likely to be discarded entirely in future are as follows:

Twin Cylinder Motor Construction.	Belt Drive.
Exhaust Governing.	Horizontal Cylinders.

The following is extract from the MOTOR WORLD, issue of December 31st, 1903, page 490:

"Until within a few months it would have been said unhesitatingly that such cars would, in almost every case, be fitted with four cylinder engines. The single cylinder vertical engine car never cut much figure in this country. The two cylinder fared somewhat better, but its displacement, presumably by the four cylinder, was thought to be inevitable more than a year ago. In the interim, however, the three cylinder type was seen to be gaining in favor, both here and abroad, and the opinion has ever been expressed that it will usurp the place of the two cylinder type. Certainly it will come in for much increased share of attention."

Extract from the MOTOR WORLD, issue of December 31st, 1903, page 492:

"For more than 7 H. P. two cylinders are always employed, and the drawback against these is it is hard to give them sufficiently good

last year introduced their three cylinder engines for light cars, and the year's working with this motor has been so satisfactory that the firm has adopted it definitely for their next year's model of light vehicles. They are, in fact, some very strong claims in favor of the three cylinder engine. As the cranks are set at 120 degrees, the moving parts turn at identically the same speed during the four revolutions, which cannot be the case when the cranks are set at 180 degrees, for while, of course, the fly wheel overcomes inertia during two parts of the cycle, and for all practical purposes the speed of the moving parts is uniform, there nevertheless remains a certain inertia which prevents the two cylinder engine from running with a perfect balance. The same thing may be said, though to a less extent, of the four cylinder engines, where the outside cranks are set at 180 degrees to the inside pair. It is found, therefore, that THE THREE CYLINDER ENGINE NOT ONLY TAKES THE PLACE OF THE TWO CYLINDER MOTOR, BUT ALSO OF THE FOUR CYLINDER, SO THAT IT IS QUITE POSSIBLE WE MAY SEE THE THREE CYLINDER ENGINE BECOME THE GENERAL TYPE."

## "ADVANTAGE OF MULTIPLE CYLINDERS."

"The practice of the modern designer has developed a tendency towards multiplicity of cylinders. Many of the well known makes which were formerly built with a single cylinder are now double, or even built with three or four cylinders. The question of the proper number of cylinders for an internal combustion engine may be briefly summed up as follows: The single cylinder has the merit of simplicity and requires less looking after, but tends toward excessive vibration. Multiple cylinders develop more power for a given weight of metal and lessen vibration and therefore strain, and have many other advantages over the single type. The question to be decided is, what number of cylinders is best in theory and practice? To give the best results, a two-cylinder Otto cycle motor should, if the cranks are opposed, have its cylinders also in opposition in order to insure a regular torque impulse. If the cranks and cylinders are not opposed it is impossible to obtain correct mechanical balance of connecting rods and pistons, and vibration is thus encouraged. If the cylinders are of the twin type with the cranks opposed, explosions must necessarily follow each other at the ratio of half a revolution apart. This produces irregular torque impulses, which set up vibration. THE BEST TYPE APPEARS TO BE THE THREE CYLINDER ENGINE, with the cylinders parallel, and the cranks set at an angle of 120 degrees apart. This gives regular impulses two-thirds of a revolution apart, and consequently even strain on the parts and conduces towards absence of vibration."

"The four cylinder engine has, of course, all of the advantages of mechanical balance claimed for the three cylinder type; but on the other hand, by reason of the greater extent of cylinder wall for the cubic capacity, it is not so economical in fuel and water consumption. The only advantage of the four compared with the three cylinder motor is the greater division of the given torque impulses, but as the difference is only one-twelfth in the four cylinder engine, the added complication does not seem to pay for the comparatively small advantage gained. (ON THE OTHER HAND THE THREE CYLINDER MOTOR HAS AN ADVANTAGE OVER THE FOUR, GIVING LIGHTNESS, RIGIDITY AND STRENGTH AS COMPARED WITH THE USUAL TYPE OF FOUR CYLINDER ENGINE, which is usually made up of two twin castings. One of the things to be most carefully avoided in motor designing is any semblance of unnecessary complexity, and the three cylinder engine, with its advantages of steady torque, light weight and simplicity of design and manufacture, seem to be as near the desideratum as it is possible to attain at